

FINAL CLOSE-OUT REPORT

EDEN SITES  
MONT A/E 87-46-106

FOR

DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HELENA, MONTANA

BY

STATE DOCUMENTS COLLECTION

APR 20 2004

MONTANA STATE LIBRARY  
1515 E. 6th AVE.  
HELENA, MONTANA 59620

DELTA ENGINEERING, P.C.  
2701 16TH STREET, N.E.  
GREAT FALLS, MT 59403  
(406) 727-3687

AUGUST , 1988



## **I. INTRODUCTION**

The Eden Sites Reclamation Project involved the reclamation of a number of abandoned coal mines in the Eden/Hound Creek area. The following is a brief description of each of the individual sites included in this project.

### **Love Mines**

The Love mines are located in Sec. 32, T18N, R4E. The project area included 5 mine adits and a small slack area. Total area covered by the project was 1/4 acre. Two of the adits were located adjacent to the Eden Route Road which is a well-travelled secondary. These adits were completely open and there was evidence that people were exploring the open mines. This health and safety hazard was the main problem at his site. The objective of the reclamation was to permanently seal all of the mine openings and reclaim the slack areas back to a natural state.

The mines are located on the rocky bluffs at the head of Ming Coulee. The area is used predominantly as cattle pasture with crop fields located along the creek that runs down Ming Coulee.

### **Bickett Mine**

The Bickett Mine is located in Sec. 31, T18N, R4E. The project area included a coal slack pile, a tippie, an adit, and various structures. The coal slack from the waste pile was eroding into the small creek below the site. The dilapidated structures posed a hazard as they were in danger of falling apart. Total area affected by the disturbances was 1.0 acre.

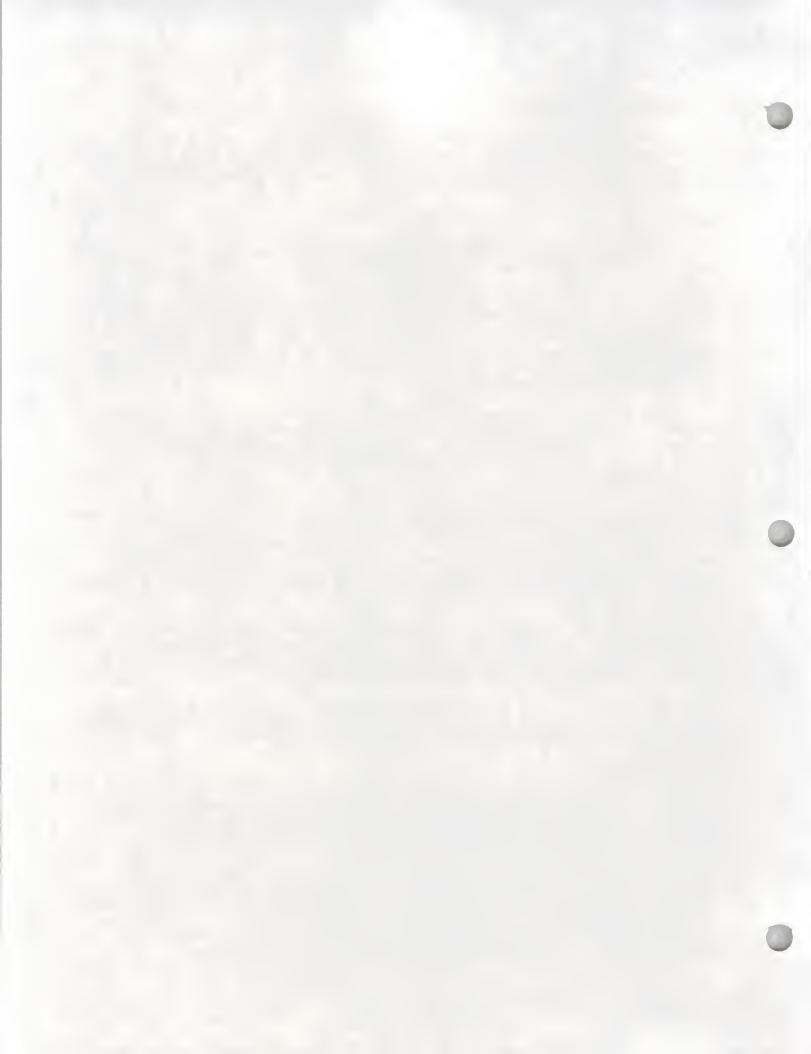
The objectives of the reclamation project at this site included the following: permanently seal the mine opening, eliminate all mine structures and debris, and reclaim the slack areas back to a natural configuration and vegetative condition.

The mine site is located along the rocky sides of Ming Coulee, adjacent to the small creek that runs down through the coulee. The land is used for cattle grazing purposes.

### **Cozzens Mine**

The Cozzens Mine is located in Sec. 18, T17N, R3E in Cascade County. The site is located on the rocky grassed hillside overlooking Smith River and Milligan Route Road below the site. The land is used for cattle grazing purposes.

The project site had a variety of problems including open adits, large dilapidated wooden structures, coal waste piles, and a small acid mine seep. The hazardous wooden structures and open adit were the main health and safety problems at the site. The total area affected by the disturbances was 3/4 of an acre.



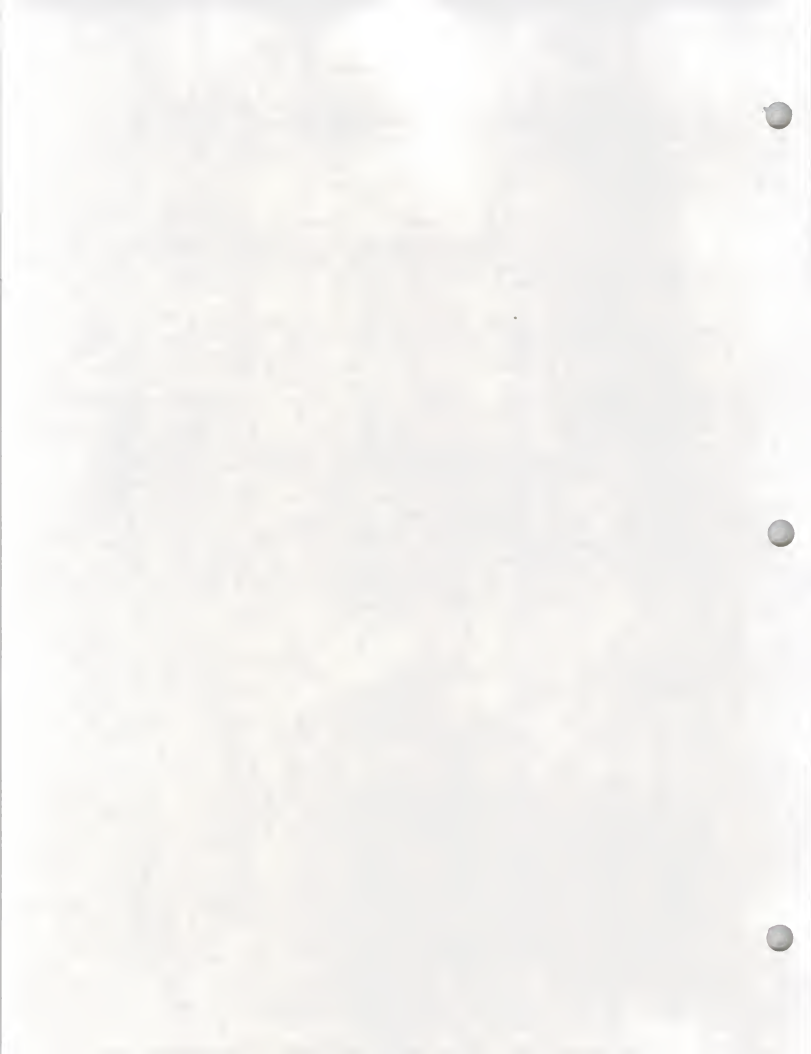
The objectives of the project included the following: permanently seal all mine openings, dispose of all mine structures and debris, and perform surface reclamation on the slack piles and disturbed areas, returning them to a natural state.

#### Hound Creek Mine

The Hound Creek project area is located in Sections 24 & 25 in T17N, R2E. The site is located on the rocky steep hillside overlooking Hound Creek below the site. The area is used by the owner to pasture cattle and sheep. Total area encompassed by the project was approximately 2 acres.

The project site included the following sources of problems: open adits, dilapidated structures, acid mine discharge, and a coal slack pile that was actively eroding into Hound Creek. Hound Creek is a small trout stream that runs directly beneath the site.

The main problem at the site was the acid mine water that was discharging from a collapsed adit and cascading down the hillside into Hound Creek. The discharge of 5 - 15 gpm is very poor quality water, very acidic and containing high concentrations of various heavy metals, notably zinc which is extremely deleterious towards fish life. The goal of this project was to install a collector and piping system to capture the acid mine discharge at the adit opening and pipe it directly to the creek. Although it will not improve the quality of the discharge, it will allow the ground surface between the adit and Hound Creek to be reclaimed. A separate project is scheduled for 1988 that will include construction of an artificial wetlands system to treat the mine discharge at this site.



## II. DESCRIPTION OF RECLAMATION CONTRACT

### A. Contract Information

Pre-bid Date August 12, 1987

Bid Date August 27, 1987

#### Lowest Bidders:

Shumaker Trucking & Excavation  
Great Falls, Montana Bid - \$46,990.00

Gordon Construction Co.  
Great Falls, Montana Bid - \$48,660.00

Swan and Sons Co., Inc.  
Anaconda, Montana Bid - \$50,021.00

Notice of Award Date August 31, 1987

Notice to Proceed Date September 14, 1987

Pre-Construction Date September 24, 1987

Dates of Actual Work  
Sept. 29 - Oct. 20  
Nov. 2 - Nov. 16  
Dec. 3 - Dec. 12

Completion Date August 10, 1988

DSL Inspector Mr. Mike Hiel

Project Engineer Mr. Rich West

Project Inspector Mr. Jim Gold





## **II. DESCRIPTION OF RECLAMATION CONTRACT (CONT'D)**

### **B. Description of Equipment and Methods Used**

The equipment and methods used on this project were very similar to past reclamation projects. The majority of the dirtwork was completed with track dozers or with end dump trucks and loaders when hauling was required. Excavators were used to dig out the trenches and adits where required. Lime was spread using a dozer and worked into the soil with a farm disc. Hay mulch was applied with a agricultural hay spreader or by hand on the steep slopes. The hay was then crimped with a commercial crimper or tracked with cat grousers on the steep slopes. Seeding was done with a small brillion seeder or by hand broadcasting on the steep slopes.

The concrete bulkhead installed at the Hound Creek site was probably the only unique item of construction on this project. The original plan was to open the partially collapsed mine up, dewater the workings, install a gravel interceptor and drain and backfill the adit. Unfortunately, the quantity of acid mine water ponded in the workings was much larger than expected. It would have been detrimental to Hound Creek (below the site) to have released hundreds of thousands of gallons of very poor quality water into the creek in an uncontrolled manner. A precast concrete bulkhead was installed across the face of the mine opening with a 4" drain through the bulkhead at floor level. A drain pipe was then connected to the bulkhead and routed right into Hound Creek. A valve was installed on the drain to control the flow from the mine into Hound Creek. The bulkhead will allow gradual dewatering of the mine until a equilibrium "base flow" condition is achieved. It is assumed that the dewatering process will take several months depending on the extent of the mine workings and the rate of flow through the throttle valve. An artificial wetlands system will be installed to treat the discharge from the adit drain in a separate project.

### **C. List of Equipment Used on The Project**

<b><u>Type</u></b>	<b><u>Make and Model</u></b>	<b><u># Units</u></b>
Track tractor	Caterpillar D8H	1
Track tractor	Caterpillar D6C	1
Track loader	Caterpillar 977K	1
Excavator	Caterpillar EL180	1
End Dump Trucks	Miscellaneous	2
Track Tractor	Caterpillar D9G	1
Wheel Loader	Caterpillar 966C	1
Excavator	Drott 50	1
Farm Tractors	John Deere, Case, Kubota	3
Farm Disc	Ford	1
Seeder	Brillion	1
Hay spreader	Hay Buster	1



### III. COST SUMMARY

#### A. Site by Site Breakdown of Construction Cost

Love Site	\$ 11,222.00
Bickett Site	\$ 8,684.00
Cozzens Site	\$ 13,639.00
Hound Creek Site	\$ 19,498.00

TOTAL FOR ALL SITES      \$ 53,043.00

#### B. Itemization of Cost per Construction Item

Item	Unit	Quantity	Average Unit Price	Total Price
Slack Removal	C.Y.	7,050	1.17	8,250.00
Topsoil	C.Y.	3,705	2.22	8,256.00
Lime Application	ACRE	3.45	813.00	2,805.00
Contour Slack	ACRE	0.50	3200.00	1,600.00
Adit Backfill	EA.	7	393.00	2,750.00
Shotcrete Adit Seals	EA.	2	2042.00	4,084.00
V-bottom Ditch	L.F.	100	12.00	1,200.00
Type I Ditch	L.F.	100	9.50	950.00
Wetland System	EA.	1	3200.00	3,200.00
Revegetation	ACRE	4.4	791.00	3,480.00
3-wire Fence	L.F.	2675	1.00	2,675.00
R & R fence	L.F.	400	1.00	400.00
Grassed Waterway	L.F.	360	0.25	90.00
Debris & Tipples Disp.	L.S.	N/A	N/A	3,150.00
Seepage Collector	EA.	1	4100.00	4,100.00
<u>Change Orders</u>				
Fan Footing and Set	EA.	1	1000.00	1,000.00
Bulkhead with Drain	EA.	1	7980.00	7,980.00
Delete Seepage Collector	EA.	1	(4100.00)	(4,100.00)
Unit Price Quantity				
Reconciliation	N/A			1,173.00

TOTAL CONTRACT PAYMENT = \$ 53,043.00



#### IV. SUMMARY OF JOB

The Eden Sites project achieved all of the objectives of the project discussed earlier in this report. All mine openings have been permanently sealed, and surface reclamation has been successful in removing all evidence of former mining activity at the sites.

The acid mine discharge at the Hound Creek site has been contained in a piping system that discharges into Hound Creek. A separate project will incorporate the pipe system into a wetland treatment system that will attempt to treat the water now discharging into Hound Creek.

The following are comments concerning the reclamation techniques and design on this project.

- Gunite adit seals are an expensive reclamation technique, but are very effective in forming a permanent seal on adits that cannot be effectively backfilled.
- A small grass fire was caused by a debris fire that could not be extinguished quickly because the Contractor's water truck had a pump malfunction. A suggestion would be to require that Contractor's test fire-fighting equipment prior to burning.
- Lime spreading with a cat blade is a poor method and coverage cannot possibly be uniform irregardless of how long they mix the soil. Contractors should be required to have a commercial lime or fertilizer spreader to effectively spread lime amendments.
- Hay mulch cannot be crimped effectively on any slope steeper than a 4:1. The tractor and the tucker both slide sideways on slopes, tearing up the seed bed and dislodging the hay. Agricultural hay spreaders all have a tendency to grind the hay into short pieces, even when the bales are soaked. It would be advisable to specify hydromulch for all sites, except for any large flat sites.
- PVC pipe specified for projects should be required to have slip-on gasket joints. Glue fittings are very difficult to install properly when it is cold, wet, or muddy around the pipe.

The landowners of the various project sites were satisfied with the results of the reclamation in most cases. There were no serious landowner relation problems during the project.

In summary, the Eden Sites project was a worthwhile, successful effort as it accomplished all of the objectives and goals expected of a reclamation project of this nature.

